NRC Office of Regulatory Research
Summary

DOE, NRC, and Industry Roles

DOE and Industry: develop new technologies and test proposals; and submit new proposals with design bases and sufficient data to demonstrate safety.

NRC: establishes regulatory requirements to ensure safety of nuclear facilities (e.g. nuclear power plants, fuel facilities) during construction, operations, and maintenance; performs reviews and inspections to ensure compliance with regulatory requirements; and conducts research to support regulatory functions.

NRC's Office of Nuclear Regulatory Research (RES)

RES is a major NRC program office mandated by Congress that is comprised of approximately 260 staff members, with an annual budget of approximately $70M. Our principal areas of research include: nuclear materials, new and advanced reactors infrastructure development; thermal-hydraulics, severe accidents, reactor physics, and safety analyses; fire protection; risk analysis; human factors and reliability; environmental transport and health effects.

With regard to licensing, applications must be complete, of high quality, and demonstrate compliance with regulatory requirements to support a timely review. NRC research supports licensing reviews by:

- developing analytical models
- confirming applicants' safety analyses
- conducting tests as necessary to independently confirm applicants' design
- identifying gaps where there is a need for new regulatory infrastructure

Technology Neutral Risk-Informed/ Performance-Based Regulatory Framework

A technology neutral framework is independent of the nuclear technology (reactor design, coolant medium). Because it is generic in nature, this type of regulatory framework would require design specific regulatory guidance to ensure regulatory requirements specified by the Atomic Energy Act and its amendment are met.

In December 2007, NRC published NUREG-1860, "Feasibility Study for a Risk-Informed and Performance-Based Regulatory Structure for Future Plant Licensing." This NUREG introduced the concept of the technology neutral risk-informed and performance-based regulatory framework, which will be pilot tested with the Next Generation Nuclear Plant (NGNP).

Conclusion

A technology neutral framework requires NRC to develop design specific regulatory guidance. This regulatory guidance will only be developed for the most probable industry design concepts that we expect to regulate domestically. For those designs for which a regulatory infrastructure will be developed, industry must provide the NRC with detailed technical information and data.

In conclusion, industry needs to conduct the majority of research in support of new nuclear technology. NRC will continue to cooperate with industry to identify most probable future technologies to develop regulatory framework.